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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

February 9, 1995

MEMORANDUM

SUBJECT: Spokane Junkyard Total and Dissolved Metals Analysis in Water
Sample Numbers: 94514595 - 94514598

FROM: Maricia M. Alforque, Chemist, USEPA, Region 10 MMA

TO: Kevin Rochlin, Project Manager, USEPA, Region 10

FULL DATA REVIEW

I have reviewed the attached data package and the corresponding raw data. Based on this review, I find that the Self Evaluation Report prepared by the ESAT contractor was conducted in accordance with the Functional Guidelines, and that the data qualifiers recommended in the ESAT contractor's evaluation are appropriate.

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ENVIRONMENTAL SERVICE ASSISTANCE TEAMS - ZONE 2

ESAT Region 10
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ICF Technology Inc.
ManTech Environmental

MEMORANDUM

DATE: January 24, 1995; revised February 3, 1995

TO: Jerry Muth, RPO, USEPA, Region 10
Isa Chamberlain, Task Monitor, USEPA, Region 10
Kevin Rochlin, Project Manager, USEPA, Region 10

THROUGH: Barry Pepich, Team Manager, ESAT, Region 10

FROM: John Alexander, Senior Chemist, ESAT, Region 10

SUBJECT: Quality Assurance Review of Spokane Junkyard - Total and Dissolved Metals in Water Analysis

Sample Numbers: 94514595 - 94514598
Project Code: TEC-637A
Account Code: 955T10PTFA10A5U

TID#: 10-9410-509
DOC#: ESAT-10A-7772
WUD#: 1517

CC: Charles Stringer, USEPA - OCI, Region 10

The following is a quality assurance review of the total and dissolved metals analysis of four samples from the Spokane Junkyard site. The analysis was performed following USEPA and laboratory guidelines by the ESAT Team at the USEPA Manchester Environmental Laboratory, Port Orchard, WA. This quality assurance review was conducted for the following samples:

Total:	94514595	94514597
Dissolved:	94514596	94514598

DATA QUALIFICATIONS

The following comments refer to the ESAT Team's performance in meeting quality control specifications outlined in the *CLP Statement of Work (CLP-SOW) for Inorganic Analysis, rev. ILMO3.0*, the *Manchester Environmental Laboratory Quality Assurance Manual, revision 5/88*, and the *Draft Quality Assurance Project Plan, Spokane Junkyard Site, Rev. August, 1994*. The recommendations presented herein are based on the information provided for the review.

1.0 TIMELINESS - Acceptable

The suggested holding time from the date of collection for mercury is 28 days and the holding time for the remaining metals is 180 days. The samples were collected on 12/19/94. Mercury analysis was performed on 12/23/94, four days from the collection of the samples. The remaining metals analyses were completed by 01/05/95, seventeen days from sample collection. No qualification was recommended based on these holding time criteria.

2.0 SAMPLE PREPARATION - Acceptable

Sample preparation procedures were in accordance to CLP-SOW guidelines; however, due to an error made during log in of the dissolved samples 94514596 and 94514598, the samples were digested and the dissolved sample 94514598 was chosen for quality control analysis, which is not in accordance with Manchester Laboratory guidelines. However, in the opinion of the reviewer, this did not detrimentally affect the data. An addendum was attached to this report which reports both digested and undigested data, at the request of the EPA. The samples were prepared using hot-plate digestion and for mercury on 12/21/94. Qualification was not recommended on this basis.

3.0 CALIBRATION - Acceptable

All samples were analyzed by ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) on 01/05/95. The instrument was standardized according to the analytical method using a blank and a series of calibration standards.

All samples were analyzed by ICP-MS (Inductively Coupled Plasma - Mass Spectrometry) on 01/05/95 for arsenic, lead, selenium and thallium. The instrument was calibrated according to the analytical method with a matrix blank and at least two standards, as required. The analytical curves were linear and correlation coefficients were greater than the minimum 0.995.

All samples were analyzed by CVAAS (Cold Vapor Atomic Absorption Spectroscopy) on 12/23/94 for total mercury. Initial calibration included a blank and at least four standards, as required. The analytical curve was linear and had a correlation coefficient greater than the minimum required 0.995.

All calibrations met acceptance criteria. No qualification of the data was recommended on this basis.

4.0 REFERENCE CONTROL SAMPLES/CALIBRATION VERIFICATION - Acceptable

Calibration verification samples are required before and after sample analysis and after every 10 samples during analysis. All control samples met frequency and performance-based recovery criteria of 90 -110% for ICP-AES and ICP-MS, and 80 - 120% for CVAAS (mercury) analysis. Qualification was not recommended on this basis.

5.0 BLANKS

Procedural blanks were prepared with the samples to indicate potential contamination from the preparation or analysis procedure. If an analyte was found in the associated blank, the sample results were recommended for qualification if the analyte concentration was less than ten times the analytical value in the blank.

Trace amounts of calcium, potassium, and sodium were detected in the ICP-AES procedural blank. All calcium results exceeded the minimum blank criterion. Sample numbers 94514597, 94514598, and 94514598DU (the sample duplicate) failed the blank criterion for potassium. The potassium results in these samples were recommended to be qualified (B) to denote possible blank contamination. Sodium failed the blank criterion in samples 94514595 and 94514596. The sodium results in these samples were recommended to be qualified (B) to denote possible contamination.

No blank contamination was detected in the ICP-MS or the CVAAS procedural blank. No qualification was recommended on this basis.

6.0 ICP-AES INTERFERENCE CHECK SAMPLE - Acceptable

The interference check sample (ICS) is analyzed by ICP-AES to verify interelement and background correction factors. Analysis is required at the beginning and end of each analysis run. The acceptance criterion for the ICS is 80 - 120 %. All results met the frequency and recovery requirements on the day of analysis.

7.0 DUPLICATE ANALYSIS - Acceptable

Duplicate analysis was performed on sample 94514598 for ICP-AES and ICP-MS, and 94514597 for CVAAS. Duplicate sample results above the laboratory's practical quantitation limit displayed acceptable precision as demonstrated by an RPD value less than 20%, as specified by Manchester guidelines. No qualification was recommended on this basis.

8.0 FIELD DUPLICATE ANALYSIS - Not Applicable

Field duplicate analysis was not indicated in the field collection documentation.

9.0 MATRIX SPIKE ANALYSIS - Acceptable

Matrix spike sample analyses are performed to provide information about the effect of the sample matrix on measurement methods. Manchester Laboratory and CLP guidelines specify that the spike recovery must be within the limits of 75 - 125%. Post spike recoveries are required to be within 85% to 115% of the spike added to the sample.

All recoveries were within specified limits. No qualification was recommended on this basis.

10.0 GRAPHITE FURNACE ATOMIC ABSORPTION SPEC. (GFAAS) QC - Not applicable

GFAAS was not performed for analysis of these samples.

11.0 ICP-AES SERIAL DILUTION - Acceptable

Sample 94514598 was analyzed by serial dilution and all results agreed within 10% difference, as required. No qualification was recommended on this basis.

12.0 DETECTION LIMITS

Sample results which fall below the instrument detection limit (IDL) are assigned the value of the instrument detection limit and the (U) qualifier is recommended for attachment. Any sample result falling between the detection limit and the quantitation limit is recommended for qualification as an estimate (P). This notifies the data user that the element was detected at the reported value, but below the minimum level of practical quantitation determined to be within precision limits of 10% relative standard deviation.

13.0 OVERALL ASSESSMENT OF DATA

The quality assurance review of the data is based on the criteria outlined in the Laboratory *USEPA CLP Functional Guidelines for Inorganic Data Review (2/94)*.

The following is a summary of the recommended qualification for the Spokane Junkyard samples total metals analysis, numbered 94514595 - 94514598. The (U) qualifier was recommended for attachment to sample results below the minimum level of detection. The (P) qualifier was recommended for attachment to sample results less than the laboratory's quantitation limit but greater than the instrument detection limit.

Potassium was recommended to be qualified (B) in samples 94514597, 94514598 and 94514598DU (2.6% of the data) to denote possible contamination. Sodium was recommended to be qualified (B) in the duplicate sample 94514595 and 94514596 (1.7% of the data) to denote possible contamination.

No additional qualification was recommended.

Definitions of laboratory data qualifiers are attached.

Digested vs. Non-digested Sample Data for Spokane Junkyard Dissolved Metals Samples

	Sample 94514596		Sample 94514598	
Analyte	Digested (ug/L)	Non-digested	Digested (ug/L)	Non-digested
Aluminum	213	221	51	50
Barium	< 2	< 2	20.3	21.8
Calcium	512	540	34500	36230
Iron	38.8	38.1	< 10	< 10
Magnesium	< 20	24	13100	13770
Manganese	1	< 1	31.1	31.4
Potassium	< 350	560	1900	2280
Sodium	248	238	3220	3348
Zinc	4.7	< 4	< 4	< 4

Note: All remaining values less than instrument detection limits.

USEPA Region 10 Laboratory

Below are the definitions for the qualifiers used in the Inorganics area when qualifying data from Inorganics analysis.

DATA QUALIFIERS

U - Element was analyzed but not detected. The associated numerical value is the instrument detection limit/method detection limit.

P - The analyte was detected above the Instrument Detection Limit, but not quantified within expected limits of precision. The laboratory has established minimum quantitation limits having a relative standard deviation of no more than 10%

H - The samples were analyzed after the suggested holding time limit.

E - The reported value is an estimate because of the presence of interference. An explanatory note will be included with the report.

B - Analyte is found in the analytical blank as well as the sample indicating possible/probable blank contamination. If analytes are found in any of the associated procedural blanks the concentration in the samples must be at least ten times the quantity observed in the blank. If the sample result fails these criteria the sample result is qualified (B).

N - Spiked sample recovery not within control limits.

NAR - There is no analysis result for this analyte.

NA - Not Applicable/Not Required.

S - Sample was analyzed by method of standard additions.

+ - Sample was analyzed by method of standard additions and the correlation coefficient was less than 0.995.

* - The analyte was present in the sample.

W - Post spike out of specified range, and sample was less than 50% the spike range, and sample was less than 50% the spike added.

Manchester Environmental Laboratory
Final Report

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected: 12/19/94
Matrix: Liquid-Total
Sample Number: 94514595
Type: Reg sample
Station Description: RBLK

MET

All MERCURY tests

Analyte	Result	Units	Qlfr
Mercury	0.20	ug/L	U

Metals, ICP RAS

Analyte	Result	Units	Qlfr
Aluminum	**383**	**ug/L**	
Antimony	40	ug/L	U
Barium	**3.4**	**ug/L**	**P**
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	**670**	**ug/L**	
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	3.0	ug/L	U
Iron	**206**	**ug/L**	
Magnesium	**65**	**ug/L**	**P**
Manganese	**7.17**	**ug/L**	
Nickel	10	ug/L	U
Potassium	350	ug/L	U
Silver	3.0	ug/L	U
Sodium	**246**	**ug/L**	**B**
Vanadium	3.0	ug/L	U
Zinc	**13**	**ug/L**	**P**

Metals, ICP/MS

Analyte	Result	Units	Qlfr
Arsenic	1.0	ug/L	U
Lead	**0.64**	**ug/L**	**P**

Analyte	Result	Units	Qlfr
Selenium	2.0	ug/L	U
Thallium	1.0	ug/L	U

Analyte	Result	Units	Qlfr

94514595 Reg sample

Manchester Environmental Laboratory
Final Report

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected: 12/19/94
Matrix: Liquid-Diss.
Sample Number: 94514596
Type: Reg sample
Station Description: RBLK\METAL

Analyte	Result	Units	Qlfr
MET			
All MERCURY tests			
Mercury	0.20	ug/L	U
Metals, ICP RAS			
Aluminum	**213**	**ug/L**	
Antimony	40	ug/L	U
Barium	2.0	ug/L	U
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	**512**	**ug/L**	
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	3.0	ug/L	U
Iron	**38.8**	**ug/L**	
Magnesium	20	ug/L	U
Manganese	**1.0**	**ug/L**	**P**
Nickel	10	ug/L	U
Potassium	350	ug/L	U
Silver	3.0	ug/L	U
Sodium	**248**	**ug/L**	**B**
Vanadium	3.0	ug/L	U
Zinc	**4.7**	**ug/L**	**P**
Metals, ICP/MS			
Arsenic	1.0	ug/L	U
Lead	0.50	ug/L	U

Manchester Environmental Laboratory

Final Report

Analyte	Result	Units	Qlfr
Selenium	2.0	ug/L	U
Thallium	1.0	ug/L	U

Analyte	Result	Units	Qlfr

94514596 Reg sample

Manchester Environmental Laboratory
Final Report

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected: 12/19/94
Matrix: Liquid-Total
Sample Number: 94514597
Type: Reg sample
Station Description: MW-3

Analyte	Result	Units	Qlfr
MET			
All MERCURY tests			
Mercury	0.20	ug/L	U
Metals, ICP RAS			
Aluminum	**94**	**ug/L**	**P**
Antimony	40	ug/L	U
Barium	**21.0**	**ug/L**	
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	**34700**	**ug/L**	
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	3.0	ug/L	U
Iron	**105**	**ug/L**	
Magnesium	**13100**	**ug/L**	
Manganese	**35.7**	**ug/L**	
Nickel	10	ug/L	U
Potassium	**1900**	**ug/L**	**PB**
Silver	3.0	ug/L	U
Sodium	**3180**	**ug/L**	
Vanadium	3.0	ug/L	U
Zinc	4.0	ug/L	U
Metals, ICP/MS			
Arsenic	**2.4**	**ug/L**	**P**
Lead	0.50	ug/L	U

Analyte	Result	Units	Qlfr
Selenium	2.0	ug/L	U
Thallium	1.0	ug/L	U

Analyte	Result	Units	Qlfr

Manchester Environmental Laboratory
Final Report

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: 94514597
Type: Duplicate
Station Description:

Analyte	Result	Units	Qlfr
MET			
All MERCURY tests			
Mercury	0.20	ug/L	U

Manchester Environmental Laboratory

Final Report

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: 94514597
Type: Matrix Spike
Station Description:

Analyte	Result	Units	Qlfr
MET			
All MERCURY tests			
Mercury	97	%Rec	

Manchester Environmental Laboratory
Final Report

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: 94514597
Type: Matrix Spike Dupl
Station Description:

Analyte	Result	Units	Qlfr
MET			
All MERCURY tests			
Mercury	98	%Rec	

Final Report

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected: 12/19/94
Matrix: Liquid-Diss.
Sample Number: 94514598
Type: Reg sample
Station Description: MW-3\METALS

MET

Analyte	Result	Units	Qlfr
All MERCURY tests			
Mercury	0.20	ug/L	U
Metals, ICP RAS			
Aluminum	**51**	**ug/L**	**P**
Antimony	40	ug/L	U
Barium	**20.3**	**ug/L**	
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	**34500**	**ug/L**	
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	3.0	ug/L	U
Iron	10	ug/L	U
Magnesium	**13100**	**ug/L**	
Manganese	**31.1**	**ug/L**	
Nickel	10	ug/L	U
Potassium	**1900**	**ug/L**	**PB**
Silver	3.0	ug/L	U
Sodium	**3220**	**ug/L**	
Vanadium	3.0	ug/L	U
Zinc	4.0	ug/L	U
Metals, ICP/MS			
Arsenic	**2.2**	**ug/L**	**P**
Lead	0.50	ug/L	U

Analyte	Result	Units	Qlfr
Selenium	2.0	ug/L	U
Thallium	1.0	ug/L	U

Analyte	Result	Units	Qlfr

94514598 Reg sample

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Diss.
Sample Number: 94514598
Type: Duplicate
Station Description:

Analyte	Result	Units	Qlfr
MET			
Metals, ICP RAS			
Aluminum	**59**	**ug/L**	**P**
Antimony	40	ug/L	U
Barium	**20.5**	**ug/L**	
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	**33800**	**ug/L**	
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	3.0	ug/L	U
Iron	**12**	**ug/L**	**P**
Magnesium	**13000**	**ug/L**	
Manganese	**30.4**	**ug/L**	
Nickel	10	ug/L	U
Potassium	**1600**	**ug/L**	**PB**
Silver	3.0	ug/L	U
Sodium	**3200**	**ug/L**	
Vanadium	3.0	ug/L	U
Zinc	4.0	ug/L	U
Metals, ICP/MS			
Arsenic	**2.1**	**ug/L**	**P**
Lead	0.50	ug/L	U
Selenium	2.0	ug/L	U
Thallium	1.0	ug/L	U

Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Diss.
Sample Number: 94514598
Type: Matrix Spike
Station Description:

Analyte	Result	Units	Qlfr
MET			
Metals, ICP RAS			
Calcium	NA		
Magnesium	NA		
Potassium	NA		
Sodium	NA		
Aluminum	96	%Rec	
Antimony	94	%Rec	
Barium	95	%Rec	
Beryllium	98	%Rec	
Cadmium	95	%Rec	
Chromium	97	%Rec	
Cobalt	96	%Rec	
Copper	95	%Rec	
Iron	96	%Rec	
Manganese	95	%Rec	
Nickel	96	%Rec	
Silver	92	%Rec	
Vanadium	99	%Rec	
Zinc	96	%Rec	
Metals, ICP/MS			
Arsenic	101	%Rec	
Lead	91	%Rec	
Selenium	103	%Rec	
Thallium	95	%Rec	

Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Diss.
Sample Number: 94514598
Type: Matrix Spike Dupl
Station Description:

MET

Metals, ICP RAS

Analyte	Result	Units	Qlfr
Calcium	NA		
Magnesium	NA		
Potassium	NA		
Sodium	NA		
Aluminum	97	%Rec	
Antimony	100	%Rec	
Barium	96	%Rec	
Beryllium	101	%Rec	
Cadmium	97	%Rec	
Chromium	98	%Rec	
Cobalt	98	%Rec	
Copper	96	%Rec	
Iron	98	%Rec	
Manganese	97	%Rec	
Nickel	97	%Rec	
Silver	94	%Rec	
Vanadium	101	%Rec	
Zinc	99	%Rec	

Metals, ICP/MS

Analyte	Result	Units	Qlfr
Arsenic	99	%Rec	
Lead	89	%Rec	
Selenium	101	%Rec	
Thallium	94	%Rec	

Analyte	Result	Units	Qlfr

Analyte	Result	Units	Qlfr

Manchester Environmental Laboratory
Final Report

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: W941221A
Type: Blank
Station Description:

MET

Metals, ICP RAS

Analyte	Result	Units	Qlfr
Aluminum	20	ug/L	U
Antimony	40	ug/L	U
Barium	2.0	ug/L	U
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	**6.5**	**ug/L**	**P**
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	3.0	ug/L	U
Iron	10	ug/L	U
Magnesium	20	ug/L	U
Manganese	1.0	ug/L	U
Nickel	10	ug/L	U
Potassium	**410**	**ug/L**	**P**
Silver	3.0	ug/L	U
Sodium	**96.9**	**ug/L**	
Vanadium	3.0	ug/L	U
Zinc	4.0	ug/L	U

Metals, ICP/MS

Analyte	Result	Units	Qlfr
Arsenic	1.0	ug/L	U
Lead	0.50	ug/L	U
Selenium	2.0	ug/L	U
Thallium	1.0	ug/L	U

Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: W941221B
Type: Blank
Station Description:

Analyte	Result	Units	Qlfr
MET			
All MERCURY tests			
Mercury	0.20	ug/L	U